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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/646,681  | 08/21/2003  | Ryan Lei             | 42P16687            | 1018             |
| 8791  | 7590        | 01/10/2006           | EXAMINER            |                  |
| BLAKELY SOKOLOFF TAYLOR & ZAFMAN<br>12400 WILSHIRE BOULEVARD<br>SEVENTH FLOOR<br>LOS ANGELES, CA 90025-1030 |             |                      | ISAAC, STANETTA D   |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2812                |                  |

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                   |              |  |
|------------------------------|-------------------|--------------|--|
| <b>Office Action Summary</b> | Application No.   | Applicant(s) |  |
|                              | 10/646,681        | LEI ET AL.   |  |
|                              | Examiner          | Art Unit     |  |
|                              | Stanetta D. Isaac | 2812         |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 2,5,6,8,13,16-18,26,29,31 and 32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,7,9-12,14,15,19-25,27,28 and 30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

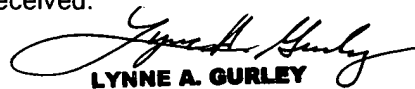
#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
**LYNNE A. GURLEY**  
**PRIMARY PATENT EXAMINER**  
**TC 2800, AU 2812**

#### Attachment(s)

- |   |  |
|---|--|
| <p>1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)</p> <p>2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)</p> <p>3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br/>Paper No(s)/Mail Date _____</p> | <p>4) <input type="checkbox"/> Interview Summary (PTO-413)<br/>Paper No(s)/Mail Date. _____</p> <p>5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)</p> <p>6) <input type="checkbox"/> Other: _____</p> |
|---|--|

### DETAILED ACTION

This Office Action is in response to the amendment filed on 10/03/05. Currently, claims 1-32 are pending. Claims 2, 5, 6, 8, 13, 16-18, 26, 29, 31 and 32 have been withdrawn.

#### *Specification*

The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 7, 9-12, 14, 19-25, 27, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Reisman et al., US Patent 4,891,329.

Reisman discloses the semiconductor method as claimed. See figures 1A-1D, and corresponding text, where Reisman teaches, pertaining to claims 1, 12 and 22, a method of forming a germanium-on-insulator (GOI) substrate comprising: forming an epitaxial germanium layer **20** on top of a first substrate **10** (the epitaxial germanium layer having a rough surface, the rough surface has a roughness value approximately greater than 2nm RMS, for claim 12; figure 1A; col. 4, lines 21-30, *Note*: the Examiner takes the position that it is inherent the rough surface

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has a roughness value approximately greater than 2nm RMS, based on Applicant's admitted prior art on page 6, paragraph [0019]); forming a first dielectric film **30** on top of the epitaxial germanium layer (on top of the rough surface, for claim 12; figure 1B; col. 4, lines 30-33); providing a second substrate **40** (figure 1C; col. 4, lines 54-59); bonding the first substrate to the second substrate by bonding the first dielectric film to the second substrate, the bonding resulted in a bonded wafer pair (figure 1C; col. 4, lines 60-65); and removing the first substrate after the bonding to expose epitaxial germanium layer to form the GOI substrate (and forming an electronic device on the GOI substrate, for claim 22; figure 1D; col. 4, lines 66-68; col. 5, lines 1-2).

Pertaining to claims 3, 14 and 27, Reisman teaches, a method, wherein the removing of the first substrate after the bonding includes one of a grind back process, an etching process, and an ion exfoliation process (figure 1D; col. 4, lines 66-68).

Pertaining to claims 7 and 30, Reisman teaches, a method wherein the removing of the first substrate after the bonding includes cleaving off the first substrate (figure 1D; col. 4, lines 66-68).

Pertaining to claims 9 and 19, Reisman teaches, a method wherein each of the first substrate and the second substrate semiconductor wafer is selected from a group consisting of a silicon (Si) substrate, a monocrystalline Si substrate, a polycrystalline Si substrate, a Si-containing substrate, a Si substrate having an oxide layer, a silicon-on-insulator (SOI) substrate, a gallium arsenide substrate, and Ge-containing substrate (col. 4, lines 22-25).

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Pertaining to claims 10 and 20, Reisman teaches, a method further comprising causing a surface activation to the top surface of the first dielectric film and at least one surface of the second substrate to facilitate the bonding (col. 4, lines 60-65).

Pertaining to claims 11 and 21, Reisman teaches, a method further comprises annealing the bonded wafer pair at a predetermined annealing temperature, wherein the annealing temperature is achieved with a temperature ramp rate of approximately 1°C/minute (col. 4, lines 64-65).

Pertaining to claim 23, Reisman teaches, a method wherein the electronic device includes one of a transistor and a detector (col. 1, lines 5-12).

Pertaining to claim 24, Reisman teaches, a method wherein the transistor includes a gate dielectric, a gate electrode, spacers, and source/drain regions (col. 1, lines 5-12).

Pertaining to claim 25, Reisman teaches, a method wherein the detector includes a waveguide encapsulated by an oxide layer and at least one electrode (col. 1, lines 1-12).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 15 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reisman et al., US Patent 4,891,329 in view of admitted prior art.

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Reisman disclose the semiconductor method substantially as claimed. See preceding rejection of claims 1, 3, 7, 9-12, 14, 19-25, 27, and 30 under 35 U.S.C. 102(e).

However, Reisman fails to show, pertaining to claims 4, 15 and 28, further comprising: polishing the surface of the first dielectric film prior to the bonding.

On page 8, paragraph [0025], the Applicant teaches, that portions of the dielectric layer, can be removed to have a smaller thickness, where a conventional method of chemical mechanical polishing (CMP) may be used to remove some of the dielectric layer.

It would have been obvious to one of ordinary skill in the art to incorporate, a method further comprising: polishing the surface of the first dielectric film prior to the bonding, in the method of Reisman, pertaining to claims 4, 15 and 28, according to the teachings of the admitted prior art, with the motivation of, reducing the amount of dielectric material, for the purpose of creating a desired dielectric thickness.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-32 have been considered but are moot in view of the new ground(s) of rejection.

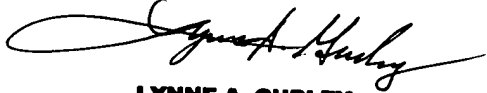
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stanetta D. Isaac whose telephone number is 571-272-1671. The examiner can normally be reached on Monday-Friday 9:30am -6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stanetta Isaac  
Patent Examiner  
December 27, 2005



**LYNNE A. GURLEY**  
**PRIMARY PATENT EXAMINER**  
**TC 2800, AU 2812**